

A POPULAR TREATISE ON THE COMMON INDIAN
SNAKES.

ILLUSTRATED BY COLOURED PLATES AND DIAGRAMS

BY

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Part XXVI (with Plate XXVI and Diagram).

(Continued from page 635 of Volume XXV.)

As now classified the large family *Colubridæ* is divided into three "series" depending upon peculiarities in the dentition of the *Maxillæ*.

Series A. Aglypha (Greek "a" without, and "glupho" I carve) comprises those snakes that have no grooved (carved) nor canaliculate fangs.

Series B. Opisthoglypha (Greek "opisthe" behind, and "glupho") the representatives of which have grooved fang-like teeth at the back of the maxilla.

Series C. Proteroglypha (Greek "proteros" in front, and "glupho") including those snakes with a pair of canaliculate or true fangs in the front of the maxilla. The first subject of this paper comes into "Series" B, and the second into "Series" C.

"Series" B. *OPISTHOGLYPHA.*

This "Series" comprises three sub-families (1) *Homalopsinæ*, (2) *Dipsadomorphiinæ*, and (3) *Elachistodontinæ*. The first of these contains our first subject.

Sub-family *HOMALOPSINÆ*.

This is again divided so as to represent ten genera, seven of which occur within Indian limits.

Genus *CERBERUS*.

Three species are known, one Australian, one peculiar to the Philippines, and a third *rhynchops* which has a wide range of distribution in India and beyond.

CERBERUS RHYNCHOPS (SCHNEIDER).

THE DOG-FACED WATER SNAKE.

History.—This was first brought to the notice of the scientific world by Russell who figured it twice, once in his First Volume

(Plate XVII) which appeared in 1796, and again in the Second Volume (Plate XL) issued in 1801. It was first christened by Schneider in 1799. Its synonymy differed with almost every writer until 1864 when Gunther fixed the proper designation under which it now rests.

Nomenclature. (a) *Scientific.*—The generic title is from Greek “kerberos,” the famous three-headed dog that guarded the entrance to Hades in Grecian mythology. The name appears to have been suggested by the forbidding aspect of the snake. The specific name is also from Greek (“rhunchos” snout, and “ops” face) probably in allusion to the peculiar under-hung condition of the lower jaw.

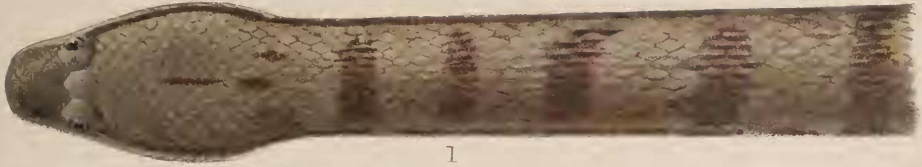
(b) *English.*—The dog-faced water snake seems to me appropriate, and is not only distinctive but accords with the scientific generic name.

(c) *Vernacular.*—None known to me.

General Characters.—The head is pear-shaped as seen from above expanding considerably towards the occiput. The snout is narrow, and in profile shows an unusually prominent lower jaw little if at all shorter than the upper. This feature to a large extent gives the snake its forbidding expression. The nostrils are directed almost as much upwards as laterally and are narrow slits convex forwards. They approach the condition seen in the sea-snakes. The eye is rather small, directed as much upwards as laterally, and the eyebrow is remarkably prominent. The iris is minutely speckled with gold and reveals a vertically elliptical pupil. The neck is fairly evident. The body is stout, and rough from the strong keels on the costal scales. It is dull dorsally, glossy on the belly, including the last three costal rows. The tail is short, rather compressed at the base, and rapidly tapers to an obtuse point. It is about one-fifth the total length of the snake.

Dimensions.—Most specimens range between two and three feet, and anything over this is unusual. The longest of which I am aware is that reported by Stoliczka from Burma which was four feet, two inches.

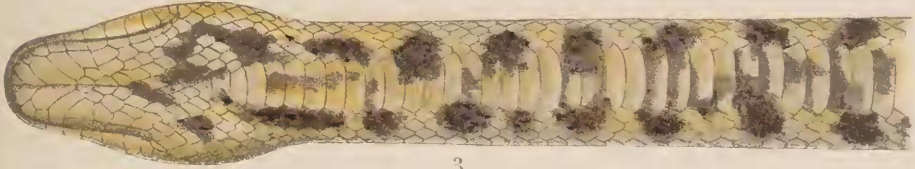
Colouration.—The back is bluish grey when the snake is submerged, lightish grey when dry. It is crossed by numerous ill-defined but conspicuous darker bars involving one to two scales in the length of the snake, the intervals involving five to seven scales. These bars grow less distinct posteriorly, and the foremost are broken up into spots in some specimens. The dorsal colouration ceases abruptly about midcosta, and is replaced by buff subcostally, and venterally. The belly is buff coarsely spotted or dappled with deep greenish black. The head is coloured above like the back, and the grey is sharply defined just above the supralabials. The upper lip and chin are buff. A conspicuous



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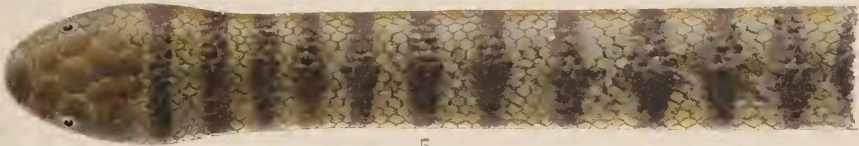
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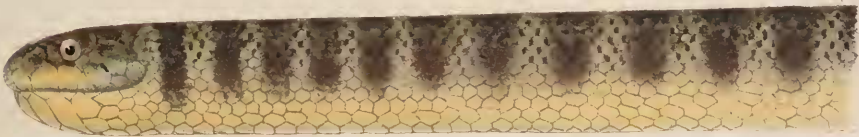
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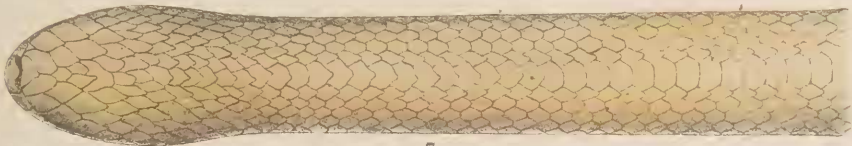
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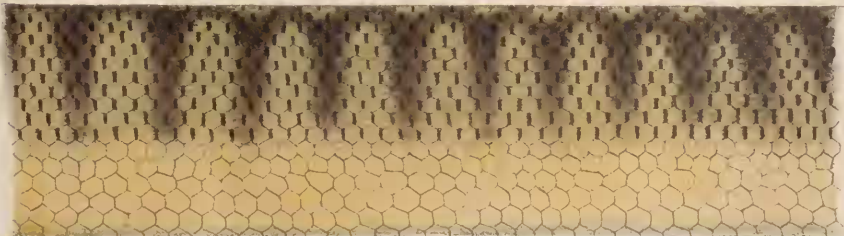
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P. Gerhardt del.

J. Green, Chromo.

THE COMMON INDIAN SNAKES, (Wall.)

1-4. *Cerberus rhynchops*, harmless. 5-8. *Enhydrina curtus*, poisonous.
all nat. size.

dark postocular streak is prolonged backwards to the side of the forebody.

Identification.—The frontal which is partially, and the parietals which are wholly broken up, furnish an easy means of knowing the snake, but perhaps a more certain method is as follows:—A snake which when laid on its back, reveals well developed ventrals at least three times the breadth of the last costal row, and at the same time shows three or more rows of costals on each side of the ventrals will prove to be a Homalopsid. *Cerberus* will be easily distinguished from its near Indian relations by possessing (1) two internasals, (2) 9 to 10 supralabials, and (3) 23 to 27 costal rows in midbody.

Haunts and habits.—It is eminently an aquatic species usually inhabiting the brackish waters of tidal-rivers, creeks, and estuaries. Ferguson and Cantor say that it frequents fresh water also, and Cantor, Haly and Flower, all report it from the sea in close proximity to our coasts. I became acquainted with it in Burma, and frequently observed it in the waters of the narrowest channels connected with the tidal-river system, as well as in the river itself. I frequently saw it swimming in the ebb and flood tides. It swims powerfully usually allowing itself to be carried with the stream, but it sometimes anchors itself to a convenient bamboo stake, anchor rope, or submerged branch by its tail, and from this purchase swings about in the current on the look-out for fish passing by. As the tide ran out many were observed lying along the branches of the trees, and bushes just above the water, and when hustled dropped off into the stream below. Numbers were left stranded on the mud flats left by the receding tide and in the teak yards nearly every bole harboured beneath it, some of these snakes. I have seen it exhibit some intelligence in the following manner. Lying extended in the length of a nearly empty ditch, after a period of quietude, it flicks its tail round first on one side and then the other in such a way as to make an unwary fish recede from the movement towards its head, when coming within sight the fish falls an easy victim to the manœuvre. Taken at a disadvantage on land it will occasionally exhibit great activity, and try to escape. When prevented from so doing it protrudes the tongue, and hisses, and flattens itself on the ground. When held down by a stick it will sometimes strike, and bite viciously, and under such excitement emits a disagreeable odour not necessarily accompanied by a discharge of the cloacal contents. When picked up it wreaths itself with some force around the hand.

Its mode of progression is curious. The body is thrown forward in a curve in advance of the head, and the head subsequently advanced; the body being again thrown forward before the snake quite extends itself. It gives the impression of moving sideways.

Disposition.—In spite of its forbidding appearance this is a peculiarly inoffensive reptile. Blanford and other have remarked upon its quiet nature and I can support their observations. It does not usually take alarm when encountered, but will permit one to approach close enough to place a stick over it, and allow itself to be captured. In captivity it is a singularly uninteresting, lethargic creature allowing itself to be handled, and rarely betraying a malicious spirit. Drumming on the glass of the vivarium even when its nose is against the glass, usually evokes little if any response. In a tank it is hardly more interesting.

Food.—It feeds exclusively and voraciously on fishes. About Rangoon on the mud flats it frequently pursued a little fish commonly called the walking perch from its mode of active progression on the mud by means of fins that are used as legs. I once found a large fish eight inches in length inside a specimen measuring three feet, three inches. I have also known an eel taken. I frequently saw *Cerberus* wriggling at the end of a fisherman's hook baited with a fish, to the disgust of the angler.

Breeding.—This like all the other Homalopsids I know is viviparous in habit. The young are born in May, June and July, but it is quite likely further observations may extend the season already known. The period of gestation is now known, but from analogy is likely to exceed six months. I found eggs with no trace of an embryo in a gravid female from Rangoon on the 21st February 1900.

It is fairly prolific, its brood amounting to at least 26. Gunther records a brood of 8. My specimen above alluded to contained 7 eggs, and three gravid females received from Moulmein captured between the 26th March and 4th April 1900, contained 14, 23 and 26 eggs. These were all in about the same stage of development, the embryos within measuring about $2\frac{1}{2}$ inches.

Growth.—In spite of the meagre figures at my disposal these furnish a good deal of information. Gunther's brood already referred to measured from 7 to $7\frac{1}{2}$ inches. I have had small specimens in Burma brought to me measuring $7\frac{5}{8}$ and $7\frac{7}{8}$ inches in May and July respectively. I find the young double their length in the first year of life, and have about trebled it by the end of the second year. It would probably take another two years before specimens attained to three feet, and I have examples of such 3 feet 1 inch, and 3 feet 3 inches in June from Burma. Unfortunately, I have lost my detailed notes regarding the length of my gravid females, so am unable to say when the species is sexually mature.

Distribution.—It occurs all along our Indian Coasts from Sind and Mekran in the North-west to Tenasserim, and through the Malayan Region to the Philippines and Pelew Islands.

It is quite common around India, but not nearly so common as in Burma where there must be literally thousands in every tidal-river. Haly reports it common in Ceylon, and Blyth says the same with reference to the Andamans. It occurs in the Nicobars.

Lepidosis, Rostral.—In contact with 4 shields, the rostro-nasal, and rostro-labial sutures subequal; sometimes a partial median suture is seen in the upper part of the shield. *Internasals.*—Two, sub-triangular; their bases apposed in the median line; the suture between them equal to rather greater than that between the præfrontal fellows, subequal to the internaso-præfrontal suture. *Præfrontals.*—Two, the suture between them subequal to the præfronto-frontal; in contact with nasal, loreal and præocular. *Frontal.*—In contact with 7 shields, frequently more or less disintegrated posteriorly. *Parietals*—Disintegrated into many parts. *Nasals.*—In contact behind the rostral; touching the first labial only. *Loreal.*—Present. *Præocular.*—One. *Postoculars.*—One or two. *Temporals.*—Replaced by small scales.

Suboculars.—One to three. *Supralabials.*—9 or 10, none touching the eye; the last three or four divided into an upper and lower part. *Infralabials.*—Many small.

Sublinguals.—One pair only present; in contact with 3 or 4 infralabials. *Costals.*—Two headlengths behind the head 25 (rarely 23); midbody 23 to 25 (rarely 27); two headlengths before the anus 19 or 17. Where the rows are 25 they reduce to 23 and again to 21 by a fusion of the 4th and 5th, or 5th and 6th rows; from 21 to 19 the 3rd and 4th rows fuse. Strongly keeled in all rows except the last for a variable extent posteriorly.

Ventrals.—Well-developed, 132 to 160. *Anal.*—Divided. *Subcaudals.*—Divided. 49 to 72.

Dentition.—*Maxillary.* 15 to 16 teeth are followed by a short edentulous space, after which there is a pair of grooved pseudo fangs little if at all larger than the preceding teeth. *Palatine.*—9. *Pterygoid.*—22 to 25. *Mandibular.*—20 to 23; the 3rd to about the 7th longest and subequal.

Our plate.—Mr. Green and Mr. Gerhardt have very faithfully portrayed a typical specimen.

“Series” C. PROTEROGLYPHA.

The “Series” is again divided into sub-families (1) *Hydrophinae* including the marine forms with valvular nostrils, strongly compressed bodies (except *Platurus*) and compressed fin-like tails, and (2) *Elapinae* which includes the terrestrial poisonous snakes with open nostrils, round or feebly compressed bodies, and a cylindrical and tapering tail.

Sub-family HYDROPHIINÆ.

This contains at least eleven genera, one of which *Enhydria* includes the first sea-snake to be discussed in these papers.

Genus ENHYDRIS.

(Greek "En" in, and "hudor" water).

Stejneger has thrown doubts on the validity of this name for the genus for which he substitutes *Lapemis* (Herpetology of Japan, 1907, p. 435). I adhere to the generic title used by Boulenger as late as 1912 (Fauna of Malay Peninsula, Rept and Batrach., p. 192) which is the one with which all of us have grown familiar. It contains only two species, viz., *curtus*, a very common snake, around our coasts, and *hardwicki* rare in Indian seas, but common further east in the Malayan Archipelago.

ENHYDRIS CURTUS (SHAW).

SHAW'S SEA-SNAKE.

History.—Described by Shaw in 1802 from a young specimen labelled "India" (the type) now in the British Museum.

Nomenclature. (a) *Scientific*.—The generic name simply implies "water snake," and the specific is from the Latin "curtus" meaning short.

(b) *English*.—I think it a fitting tribute to the work of Shaw, once the herpetologist, and custodian of the reptile collections in the British Museum, to associate his name with the species.

(c) *Vernacular*.—None known to me.

General Characters.—The species is remarkably stout, and short for a sea-snake. The head is massive, and the jaws strong, the body heavy, short, and strongly compressed, and the tail markedly compressed, and fin-like.

Colour.—The dorsum is olivaceous-green merging about midcosta to pale yellow. The back is beset with a series of dark greenish-brown or greenish-black rather ill-defined crossbars, about 45 to 55 in number, and rather broader than the interspaces. The first of these passes across the back of the head. In the young these bars extend further ventrally, and often form complete bands.

Identification.—Very easily recognised among all Indian sea-snakes on account of the disintegrate condition of the parietal shields. An alternative method concerns the breadth and number of the ventrals. These shields are so little enlarged in midbody and posteriorly that they hardly deserve the name of shields, but would be better considered as scales. Their number 130 to 219, with their feeble development will establish the genus. *Curtus* is easily distinguished from *hardwicki* by the parietal shields being

broken up into three parts (rarely more). Again in *curtus* with very few exceptions the suture from the nostril passes to the second supralabial, whereas in *hardwicki* it passes to the first.

Habits.—It frequents our Indian Coasts in large numbers. In rough weather in common with other sea-snakes it appears to keep well out to sea, judging from the dearth of numbers brought in from the fishing nets at this time. I have known a specimen taken on land close to a backwater one and-a-half miles from the sea. Out of 84 specimens collected in June and July this year which I sexed 21 were ♂ and 28 ♀. The tubercles on the scales in females are feeble, but in males are stronger, and on the lowest costal rows in old adults actually spinose. The male when adult has also a distinct swelling at the base of the tail not seen in the female.

Breeding.—The season for the birth of the young is probably from May to August. I had 12 gravid females from Madras between the 20th June and the 12th of July this year. The fœtuses 22 in number ranged between $8\frac{1}{2}$ and 14 inches. Other specimens already born this year numbering 9, measured from $13\frac{3}{4}$ to $17\frac{1}{2}$ inches. From this one may infer that the $17\frac{1}{2}$ inch specimen had been born probably in May if not before, and that the $8\frac{5}{8}$, and $8\frac{1}{2}$ inch specimens would not have been born till August, or possibly later. Seven of the nine young of the year measured from 13 to 15 inches, and this taken with the fact that one fœtus measured 14 inches, makes it appear that the young are about 13 to 14 inches long at birth. They are contained in the usual transparent sacs seen in viviparous snakes, but these are relatively much larger than I have observed in other species. Most of the sacs were 3 inches, some 4 and one even $4\frac{1}{4}$ inches in length.

It is the least prolific of all the snakes I know except *Hydrophis gracilis*.—Four mothers contained but a single fœtus, seven contained 2 only (one of these an infertile egg also), and one held 4 embryos. These mothers varied in length from 27 to $32\frac{1}{2}$ inches and it appears to me that the smallest length would have been attained at the end of the second year of life. If my inference is justified from the figures at my command, this species attains to sexual maturity a year earlier than other snakes whose habits I have studied. I find that at the end of the first year seven specimens had attained to a length of from 19 to $21\frac{3}{4}$ inches, and if a similar rate of growth is allowed for the second year, *i.e.*, 6 to 8 inches, the length of the smallest mother would easily be acquired by that time.

Food.—Remains of fish in the stomachs of many show it depends upon this form of diet in common with other hydrophids. I was not able to procure any fish in a suitable state to make the identification probable.

Poison.—I know of no records in the human subject of a bite, but the venom has been experimented with in the laboratory by Fraser and Elliot.

Quality.—The poison from Madras specimens submitted to these experts was described as consisting of thin scales of a very pale yellow colour.

Quantity.—Dr. Pinto who collected the poison found the average yield from eight fresh specimens represented .00275 grammes when dried.

Toxins.—Fraser and Elliot found the effects of the poison on lower animals almost exactly that produced by cobra venom, except that the respiratory embarrassment in *curtus* poisoning was much more pronounced. The action is practically identical with that of *Enhydrina* venom. As this is dealt with fully in the 28th and last paper of this series the reader is referred to that article for particulars of the composition and action, of this poison, symptoms and treatment. Death is caused by a paralysis of the respiratory centre in the brain as in the toxæmia of other colubrine snakes.

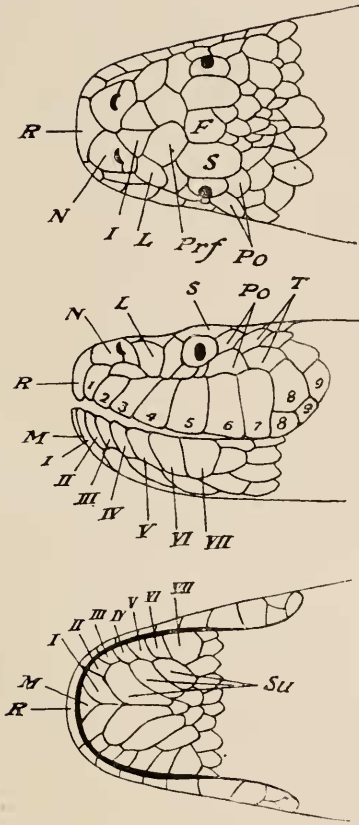
Lethal dose.—The minimal lethal dose for rats is .0006 grammes per kilogramme weight of the rodent. As the lethal dose of *Enhydrina* venom for rats was found to be .00009 grammes, the toxicity of this is about seven times greater than that of *curtus*.

Distribution.—From the Persian Gulf to the Malayan Archipelago. I found it very common on the Malabar Coast about Cannanore, where it is only second to *Enhydrina valakadyn* in its numerical strength. On the Coromandel Coast at Madras a collection of 192 sea-snakes furnished me with 84 specimens as compared with 60 *Enhydrina*s.

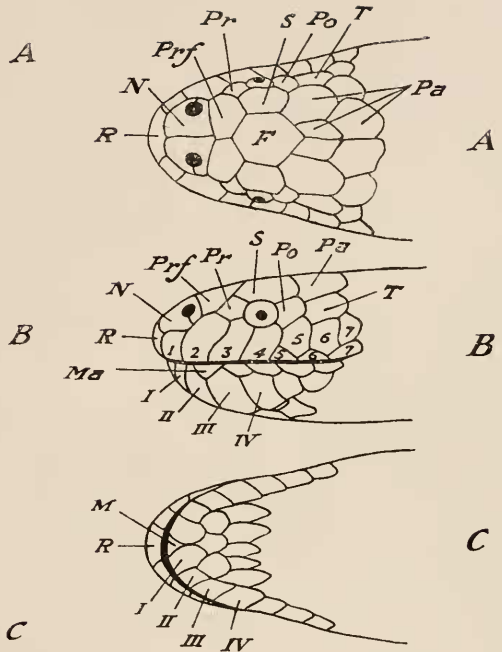
Lepidosis, $\frac{3}{4}$ Rostral.—Touches 4 shields, the portion visible above one-third or less than one-third the length of the suture between the nasals. *Nasals.*—Touch the 1st and 2nd supralabials; the suture from the nostril passes to the 2nd (rarely 1st) supralabial.

Præfontals.—Touch the 2nd supralabial. *Frontal.*—Entire.

Parietals.—Disintegrate, usually into three parts. *Præocular.*—One. *Postocular.*—One or two. *Temporals.*—Scale-like, two or three superposed scales anteriorly. *Supralabials.*—7 usually (sometimes 8); the 3rd and 4th normally touch the eye (rarely the 4th only or the 3rd, 4th and 5th). *Infralabials.*—4; the 4th largest, and in contact with three or four scales behind. *Marginals.*—A complete row after the 2nd infralabial. *Sublinguals.*—Poorly developed. Often so small as hardly to deserve the name; both fellows separated by scales. *Costals.*—Two headlengths behind the head 29 to 36; midbody 30 to 45; two headlengths before the anus 31 to 32; tuberculate, juxtaposed everywhere; the lowest 3 or 4 rows enlarged and in old males often with spinose tubercles. *Ventrals.*—151 to 219; entire anteriorly, divided posteriorly. Each part in old males with



CERBERUS RHYNCHOPS
($\times 1\frac{1}{2}$)



ENHYDRIS CURTUS
(nat. size.)

spinose tubercles. *Dentition.* *Maxilla.*—Behind the paired fangs there are usually 4 (rarely 3) grooved teeth. Palatine 5 to 6; an edentulous space behind that would accommodate about two more teeth. *Pterygoid.*—18 to 22. *Mandibular*—12 to 16.

Our plate is in every way excellent.

(*Explanation of figures for all.*)

<i>F.</i>	Frontal.
<i>I.</i>	Internasals.
<i>L.</i>	Loreal.
<i>M.</i>	Mental.
<i>Ma.</i>	Marginal.
<i>N.</i>	Nasals.
<i>Pa.</i>	Parietals.
<i>Po.</i>	Postoculars.
<i>Pr.</i>	Præocular.
<i>Prf.</i>	Præfrontals.
<i>R.</i>	Rostral.
<i>S.</i>	Supraocular.
<i>Su.</i>	Sublingual.
<i>T.</i>	Temporals.
<i>Arabic numerals</i>	Supralabials.
<i>Roman</i> ,,	Infralabials.

(*To be continued.*)